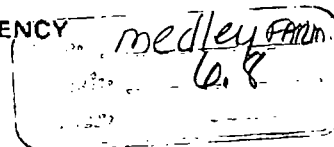




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460



DEC 17 1992

OFFICE OF  
SOLID WASTE AND EMERGENCY RESPONSE

**MEMORANDUM**

**SUBJECT:** Review of the Preliminary Remedial Design Report and Drawings for the Medley Farm Site, SC

**FROM:** Kenneth Skahn (5203G) *Kenneth Skahn*  
OERR/HSCD/DCMB

**TO:** Ralph Howard, RPM  
Region IV, North Superfund Remedial Branch

I have reviewed the Preliminary Remedial Design Report and Drawings for the Medley Farm Site as requested. I found the PRPs' documents to be fairly thorough and generally meeting the guidelines for a preliminary design submittal. My only comments are as follows:

1. The design calls for an air stripping tower for treating groundwater and soil vapor extraction units to be installed. Usually there are many assumptions made and reliance is placed on field test data that then become the basis for selection of the equipment. I suggest that you discuss with the PRPs or their designer the possibility of maintaining flexibility in the design by providing the ability to delete or add treatment units as needed once the wells are operating. There have been instances where a single unit has been called for and then found to be over- or under-sized because the design criteria was different than the final conditions. It may be more practical to call for two smaller units, with room for expansion to a third unit than to rely on a single unit. The point is to provide enough flexibility in the design to account for possible variations in field conditions. The use of several units would also allow for maintenance or replacement of a treatment unit without shutting down the entire system.
2. The "Preliminary Specification List" on page 3-31 does not include any of the treatment equipment (air stripper and soil vapor extraction units).



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## FACSIMILE COVER SHEET



U.S. Environmental Protection Agency

Office of Emergency and Remedial Response  
Hazardous Site Control Division (OS-220W)  
Washington, D.C. 20460

Date: 12/16/92 Pages Transmitted 3  
(including cover)

To: Ralph Howard

Region/Lab/Firm: Region 4 / NSRB

Fax #: 404/347-1695 Phone #: 404/347-7791

FROM: Ken Skahn

Phone #: (703)603-9100

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Transmitted from: Office of Emergency and Remedial Response  
Hazardous Site Control Division  
Crystal Station, 6th floor  
Phone: (703)308-8313  
Fax: (703)308-8389

# Fax Message

Date: DEC. 18, 92

Number of Pages including Cover Sheet: 4

## Please Deliver This Fax Message

TO: Ralph Howard  
Name

EPA, Region IV  
Organization/Department

(404) 347-1695 ( )  
Fax Number Office Phone

FROM: Richard Haynes  
Name

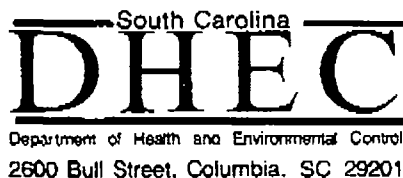
Solid & Haz. Waste  
Bureau/Division/Section

( ) (803) 734-5487  
Fax Number Office Phone

SUBJECT/COMMENTS: \_\_\_\_\_

Medley Comments

South Carolina  
Department of Health  
and  
Environmental Control  
2600 Bull Street  
Columbia, SC 29201



Interim Commissioner: Thomas E. Brown, Jr.

Board: John H. Burriss, Chairman  
Richard E. Jabbour, DDS, Vice Chairman  
Robert J. Stripling, Jr. Secretary

William E. Applegate, III,  
Toney Graham, Jr., MD  
Sandra J. Molander  
John B. Pate, MD

*Promoting Health. Protecting the Environment*

December 18, 1992

Ralph Howard  
Remedial Project Manager  
U.S. EPA, Region IV  
345 Courtland Street  
Atlanta, GA 30365

RE: Medley Farms Preliminary Remedial Design Report

Dear Mr. Howard:

The Preliminary RD Report for Medley Farms has been reviewed. The report overall looks good. The following comments need to be cleared up before this document is made final.

**General Comments:**

① The State will agree to no VOC emissions treatment of the air stripper emissions if the SCDHEC Bureau of Air Quality Control gives written exemption. For emissions of VOCs from the SVE system, EPA will have to issue an ESD to the ROD if no treatment of these emissions is selected. The ROD states granular activated carbon (GAC) would be used to treat emissions from the SVE system. The State has reservations about not using a GAC system to treat the SVE emissions. The levels of VOCs in the soils are in the ppm range, whereas VOCs in the groundwater are in the ppb range. However, if SCDHEC Bureau of Air Quality Control gives an exemption for emissions from the SVE system, I will accept no treatment if RMT shows that the cost of treating emissions with GAC is significantly higher than just using a particulate filter.

② Approval of the locations of extraction wells will have to wait until the results from the third quarter sampling is available for review. These results could change the locations of the extraction wells to ensure capture of the leading edge of the plume. When will the third quarter results be available? What groundwater flow model will RMT use to evaluate the effectiveness of the groundwater recovery system?

③ The treatment train selected for treating the extracted groundwater does not include any backup protection. Most treatment trains will have a GAC unit for use in startup and for backup in case of system malfunctions and maintenance. This backup system insures that water will not be discharged without treatment. RMT needs to explain their reasons for not including a GAC backup unit.

Mr. Ralph Howard  
Medley Preliminary RD  
December 18, 1992  
Page 2

4

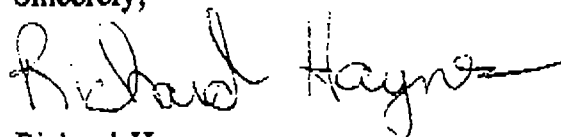
RMT needs to obtain all the necessary building permits, such as Stormwater and Soil Erosion Control permit, Cherokee County Building permit, Electrical Permit, well permits, etc.

5

RMT needs to explain in detail the SVE field testing proposed. The State requested a pilot test be performed to determine the design parameters for the SVE and RMT stated that a pilot test was not needed. Please explain the reasons for this change. The State agrees that field testing is needed.

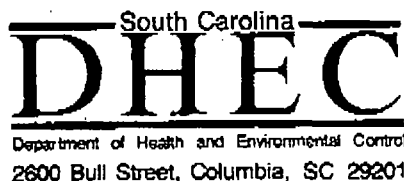
Attached are additional comments from our Hydrogeology Section. If you have any questions please call me at (803) 734-5487.

Sincerely,



Richard Haynes  
Site Engineering Section  
Bureau of Solid & Hazardous Waste  
Management

cc: Billy Britton



Interim Commissioner: Thomas E. Brown, Jr.

Board: John H. Burris, Chairman  
Richard E. Jabbour, DDS, Vice Chairman  
Robert J. Stripling, Jr. Secretary

William E. Applegate, III,  
Toney Graham, Jr., MD  
Sandra J. Molander  
John B. Pate, MD

Promoting Health, Protecting the Environment

## MEMORANDUM

TO: Richard Haynes, Engineer  
Site Engineering Section  
Division of Site Engineering and Screening  
Bureau of Solid and Hazardous Waste Management

FROM: Billy Britton, Hydrologist *Billy Britton*  
Superfund and Solid Waste Section  
Division of Hydrogeology  
Bureau of Solid and Hazardous Waste Management

DATE: December 18, 1992

RE: Draft Preliminary Remedial Design Report  
Medley Farm NPL Site  
SCD 980 558 142  
Cherokee County

The referenced document has been reviewed by the Division of Hydrogeology (Division); as requested. The following comments appear necessary.

- 1) Groundwater contamination was detected at the site at a depth of 20 feet into bedrock during the remedial investigation. However, on page 3-18 the responsible parties' (RPs') contractor proposes to install groundwater extraction wells a minimum of ten feet into competent bedrock. The Division requests that the proposed extraction wells be installed deeper into the bedrock to remediate groundwater contamination that may have migrated into lower portions of the bedrock aquifer.
- 2) In Appendix A, the RPs' contractor proposes to discharge groundwater removed from the pumping wells during the interim groundwater pumping tests into an open top 55-gallon drum equipped with an aspirator for air-stripping VOCs. Following aspiration, it is also proposed that the groundwater will flow into a trench and be allowed to infiltrate to the subsurface. The Division requests that following aspiration, the water produced during the pump test be allowed to infiltrate into the subsurface at a location where soil vapor extraction is planned because as currently proposed there is no provision for determining how effective the proposed application of aspiration will be.

**B&V WASTE SCIENCE AND TECHNOLOGY CORP.**

1117 Perimeter Center West, Suite W 212, Atlanta, Georgia 30338, (404) 392-9227, Fax: (404) 392-9289

US EPA - Region IV  
Medley FarmsBVWST Project 45262.001  
BVWST File  
December 14, 1992Mr. Ralph O. Howard, Jr.  
U.S. Environmental Protection Agency  
Region IV  
345 Courtland Street, NE  
Atlanta, GA 30365Subject: Comments on Preliminary Remedial  
Design Report for the Medley  
Farms Site

Dear Ralph:

Enclosed are the B&V Waste Science and Technology Corporation comments on the Preliminary Remedial Design Report for the Medley Farms Site in Gaffney, South Carolina. The report was produced by RMT, Inc. of Greenville, South Carolina and is dated November 1992.

Please call me at 404/901-5113 if you have any questions concerning these comments.

Very truly yours,

B&amp;V WASTE SCIENCE AND TECHNOLOGY CORP.

Keith Matteson  
Project Managersem  
Enclosure

Post-It™ brand fax transmittal memo 7671		# of pages 3
To <i>Ralph Howard</i>	From <i>Keith Matteson</i>	
Co.	Co.	
Dept.	Phone #	
Fax #	Fax #	

**COMMENTS  
ON THE  
PRELIMINARY REMEDIAL DESIGN REPORT**

**MEDLEY FARMS SITE  
GAFFNEY, SOUTH CAROLINA**

COMMENT NO.	PAGE	PARAGRAPH	COMMENT
1	2-1	4	What is meant by "limited" pump test? <i>good - but it is in PCN.</i>
2	2-9	6	More information on GPTRAC should be included, probably in an Appendix.
3	2-26	1	The proposed pump test should provide a more reliable K value for use in modeling.
4	Plate 3		More wells may be needed if the time period to achieve full plume contaminant is two years or more. Was periodic well shut-down for maintenance considered? <i>✓</i>
5	3-6	Figure 3-1	Is this figure complete? Should a detail be shown in the box in the middle of the figure? <i>~</i>
6	3-7	Figure 3-2	Will the wells be screened in the saprolite, the bedrock or both?
7	3-8	3	Is direct air discharge from the air stripper permitted?
8	3-9	1	How was the spacing of the vapor recovery wells determined?
9	3-9	5	In large lines, if vapor content is high, freezing can occur on inner walls, increasing back pressure and reducing overall efficiency.
10	3-11	3	A drop in pressure could help determine when a filter should be changed.
11	3-21	2	What will the screen length be?
12	3-22	2	First bullet states that manifold line will be four inches, second bullet states line will be sized in the future. <i>✓</i>



COMMENT NO.	PAGE	PARAGRAPH	COMMENT
13	Append IX B, P.3	7	This paragraph states that the vapor extraction wells will be four inches in diameter. On page 3-21 it is stated that the wells will be two inches.
14	Drawing 938-CO2		It appears that the soil vapor extraction wells, on the Key Plan, are labeled with soil boring call outs (SB-X).

## FACSIMILE COVER SHEET

Superfund Technology Demonstration Division  
Technical Support Branch  
Cincinnati, Ohio 45268



Date 12/21/92 Pages Transmitted 10  
(including cover)

TO: RALPH HOWARD

LOCATION: REGION IV

FAX NUMBER: 404-347-1695

FROM: MICHELLE SIMON

PHONE NUMBER: 513-569-7469

COMMENTS:

Transmitted From: Risk Reduction Engineering Laboratory  
Superfund Technology Demonstration Division  
Phone FTS 884-7519, (513) 569-7519  
FAX FTS 884-7676, (513) 569-7676



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF RESEARCH AND DEVELOPMENT  
RISK REDUCTION ENGINEERING LABORATORY  
CINCINNATI, OHIO 45268

**DATE:** December 21, 1992

**SUBJECT:** Review of Preliminary Design for the Medley Farm Site

**FROM:** Michelle Simon  
Chemical Engineer, Regional Support Section  
Technical Support Branch  
Superfund Technology Demonstration Division

**TO:** Ralph O. Howard, Jr.  
Remedial Project Manager  
Region IV

**CC:** Joan Colson  
Leader, Engineering Technical Support Center  
Technical Support Branch  
Superfund Technology Demonstration Division

Please find attached reviews performed by the technology teams concerning the Preliminary Design for the Medley Farm Site.

Ron Turner, the leader of the Aqueous Team, notes that in his previous reviews, he was concerned that the groundwater recovery system would require air pollution controls and that the groundwater would require chemical or other treatment to minimize scaling and corrosion. Both of these concerns are addressed in the Preliminary Design document.

Uwe Frank reviewed the preliminary design for the soil vapor extraction system. He notes that while generally SVE is an applicable technology for the contaminants of concern at this site, SVE can only be recommended for sites with adequate permeability. The permeability of the soil at Medley farm is currently unknown but will be determined during the pilot phase for SVE. He anticipates that the clayey/silty sands at the Medley site may be only marginally permeable. The pilot will provide the currently lacking data on permeability and other SVE design parameters.

During his review he did not know the soil remediation goals. After speaking with you, I discussed the range of remediation goals with him. The most stringent clean up goals; 40 ug/kg methylene chloride and 60 ug/kg 1,2 dichloroethane appear achievable for SVE.

You may wish to discuss the applicability of SVE at this site further with Mr. Frank - (908) 321-6626. Or you may reach me at (513) 569-7469.

Attachments



DEC 21 '92 10:45 USEPA,RREL,STDD,TSB 513-569-7676



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF RESEARCH AND DEVELOPMENT  
RISK REDUCTION ENGINEERING LABORATORY  
CINCINNATI, OHIO 45268

REPLY TO:  
Releases Control Branch  
U. S. EPA (MS-106)  
2890 Woodbridge Avenue  
Edison, New Jersey 08837-3679

DATE: December 16, 1992

SUBJECT: START Technology Team Review of SVE for Medley Farm Site,  
South Carolina

FROM: Uwe Frank *Uwe Frank*  
Chemist, Technology Evaluation Section, RCB  
Superfund Technology Demonstration Division

TO: Joan Colson  
TSC Coordinator, Technical Support Branch  
Superfund Technology Demonstration Division

In accordance with the attached request, I have reviewed information provided in RMT's preliminary design report, dated November 1992. Also as requested my review addresses only soil vapor extraction (SVE).

Although most of the report concentrates on ground water recovery and treatment, SVE is discussed in sections 3.2.2 and 3.4.9. In addition, I have previously reviewed the ROD, Final Remedial Investigation Report, and the March 6, 1992 Technical Memorandum from RMT, Inc. The primary factors that were considered to determine the practicality of SVE at this site, were contaminant volatility and concentration, and soil permeability. From this it appears that SVE could be an applicable technology for use at this site, based on the type of contaminants present and their respective volatilities (vapor pressure, Henry's Law constants). Data on soil permeabilities are still needed, however, to assure that there will be adequate vapor flow through the sub-surface strata.

The current RMT report presents additional data on soil contaminant concentrations above potential remediation levels. These concentration levels range from 50 ug/kg (Methylene Chloride) to 4,500 ug/kg (1,2 - Dichloroethane) as presented in table 2-5. These concentration levels appear adequately high for effective SVE. However it is not clear from this table what remediation limits are to be achieved. SVE is not as applicable if the concentration limits are low compound-specific limits (e.g., 5 ug/kg tetrachloroethylene or 10 ug/kg trichloroethylene) to be achieved in a short duration of time. The performance of SVE at such low levels has not been widely demonstrated, especially in nonhomogeneous soils. However, the site is a good candidate for SVE if the concentration limits to be achieved are high ug/kg limits (e.g., total VOCs greater than 500 ug/kg).

- 2 -

The soil permeability at the remediation site has not been determined. Instead, RMT is relying on previous experience. Residual soil at the site is absent or occurs as a thin layer overlying the saprolite. This soil layer ranges in thickness from zero to 11 feet and typically consists of clayey silt with varying amounts of fine sand, clay, silt and silty clay fill. The saprolite across the site, ranges in thickness from 50 to 70 feet near the former disposal areas to 7 to 28 feet along Jones Creek at the eastern boundary of the property. The lithologic characteristics of the saprolite are similar to the residual soils and are relatively consistent both vertically and horizontally. Saprolite observed in borings drilled at the site consists predominantly of a silt with varying amounts of fine to coarse sand, clay, mica flakes, and quartz gravel. Soils such as sands and gravel are highly permeable and amenable to SVE. Fine textured soils high in silt and/or clay are more slowly permeable and SVE may or may not be applicable. Since the Medley farm site is mostly described as consisting of clayey/silty sands, the soil permeability may only be marginal (see attached table, Freeze and Cherry, 1979). On page 3-9 of the RMT report it is stated that treatability testing will be conducted during the Winter/Spring of 1993. This should provide the currently lacking data on permeability and design parameters.

The current engineering design envisions 18 soil vapor extraction wells and will be constructed using 2" piping. This diameter is the minimum recommended and may or may not be adequate. Hopefully, the treatability study will confirm its adequacy. Otherwise, more and/or larger diameter extraction wells have to be drilled.

On the whole, the proposed SVE remediation plan appears satisfactory. However additional data, especially on soil permeability and well spacings is definitely needed.

If you have any questions, please call me on 908-321-6626.

#### Attachments

cc: Daniel Sullivan - w/attachment  
Michael Gruenfeld - w/attachment

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Table 2.2 Range of Values of Hydraulic Conductivity and Permeability

Rocks	Unconsolidated deposits					
		$k$ (darcy)	$k$ (cm <sup>2</sup> )	$K$ (cm/s)	$K$ (m/s)	$K$ (gal/day/ft <sup>2</sup> )
Karst limestone Permeable basalt Fractured igneous and metamorphic rocks Limestone and dolomite Sandstone Unfractured metamorphic and igneous rocks Shale Unweathered marine clay Glacial fill	Gravel Clean sand Silty sand Silt, loess	10 <sup>5</sup>	10 <sup>-3</sup>	10 <sup>2</sup>	1	
		10 <sup>-4</sup>	10 <sup>-4</sup>	10	10 <sup>-1</sup>	10 <sup>6</sup>
		10 <sup>3</sup>	10 <sup>-5</sup>	1	10 <sup>-2</sup>	10 <sup>5</sup>
		10 <sup>2</sup>	10 <sup>-6</sup>	10 <sup>-1</sup>	10 <sup>-3</sup>	10 <sup>4</sup>
		10	10 <sup>-7</sup>	10 <sup>-2</sup>	10 <sup>-4</sup>	10 <sup>3</sup>
		1	10 <sup>-8</sup>	10 <sup>-3</sup>	10 <sup>-5</sup>	10 <sup>2</sup>
		10 <sup>-1</sup>	10 <sup>-9</sup>	10 <sup>-4</sup>	10 <sup>-6</sup>	10
		10 <sup>-2</sup>	10 <sup>-10</sup>	10 <sup>-5</sup>	10 <sup>-7</sup>	1
		10 <sup>-3</sup>	10 <sup>-11</sup>	10 <sup>-6</sup>	10 <sup>-8</sup>	10 <sup>-1</sup>
		10 <sup>-4</sup>	10 <sup>-12</sup>	10 <sup>-7</sup>	10 <sup>-9</sup>	10 <sup>-2</sup>
		10 <sup>-5</sup>	10 <sup>-13</sup>	10 <sup>-8</sup>	10 <sup>-10</sup>	10 <sup>-3</sup>
		10 <sup>-6</sup>	10 <sup>-14</sup>	10 <sup>-9</sup>	10 <sup>-11</sup>	10 <sup>-4</sup>
		10 <sup>-7</sup>	10 <sup>-15</sup>	10 <sup>-10</sup>	10 <sup>-12</sup>	10 <sup>-5</sup>
		10 <sup>-8</sup>	10 <sup>-16</sup>	10 <sup>-11</sup>	10 <sup>-13</sup>	10 <sup>-6</sup>
						10 <sup>-7</sup>

Table 2.3 Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, $k^*$			Hydraulic conductivity, $K$		
	cm <sup>2</sup>	ft <sup>2</sup>	darcy	m/s	ft/s	gal/day/ft <sup>2</sup>
cm <sup>2</sup>	1	$1.08 \times 10^{-3}$	$1.01 \times 10^8$	$9.80 \times 10^4$	$3.22 \times 10^3$	$1.85 \times 10^9$
ft <sup>2</sup>	$9.29 \times 10^2$	1	$9.42 \times 10^{10}$	$9.11 \times 10^3$	$2.99 \times 10^6$	$1.71 \times 10^{12}$
darcy	$9.87 \times 10^{-9}$	$1.06 \times 10^{-11}$	1	$9.66 \times 10^{-6}$	$3.17 \times 10^{-5}$	$1.82 \times 10^1$
m/s	$1.02 \times 10^{-3}$	$1.10 \times 10^{-6}$	$1.04 \times 10^5$	1	3.28	$2.12 \times 10^6$
ft/s	$3.11 \times 10^{-4}$	$3.35 \times 10^{-7}$	$3.15 \times 10^4$	$3.05 \times 10^{-1}$	1	$5.74 \times 10^5$
gal/day/ft <sup>2</sup>	$5.42 \times 10^{-10}$	$5.83 \times 10^{-13}$	$5.49 \times 10^{-3}$	$4.72 \times 10^{-7}$	$1.74 \times 10^{-6}$	1

\*To obtain  $k$  in ft<sup>2</sup>, multiply  $k$  in cm<sup>2</sup> by  $1.08 \times 10^{-3}$ .

December 1, 1992

Subject: Review of the Preliminary Remedial Design for the Medley Farm Site

From: Ron Turner *RJT*  
Aqueous Technology Team

To: Joan Colson  
Engineering Technical Support Center

Our first review of the Remedial Action Plan for groundwater recovery and treatment (March 1992) indicated concerns that the stripper offgas could require air pollution controls and the influent groundwater could require treatment to minimize scaling and corrosion. Both of these concerns were addressed in the present document. The Contractor (RMT) has prepared justifications for an air permit waiver. If granted by the State, no controls of VOCs from the stripper will be necessary. Additional groundwater samples are to be obtained in the fourth quarter, 1992, to determine if pretreatment is required to control iron, alkalinity, etc.

The RD report indicates an intermittent operation of the air stripper. In the event that this condition or unforeseen operating difficulties could cause the VOC remediation levels to be exceeded in the stripper effluent, it is suggested that piping be provided to return the effluent to the surge tank for reprocessing.

March 24, 1992

Subject: Review of the Remedial Action Plan for Medley Farm, SC, Site

From: Ron Turner *RJ*  
TEDS, PCSB, WHWTRD

To: Michelle Simon  
RSS, TSB

The groundwater remediation information for extraction/air stripping was reviewed. I agree with the Contractor (RMT) that air stripping technology is well established for the compounds of concern, and separate treatability studies may not be necessary to provide information for the design. The air stripper removal efficiency will have to approach 99 percent for the higher initial concentration VOCs, but this is within the technology. However, two columns in series could be necessary, depending on the liquid loading rate and the air-to-water ratio.

The offgas VOC control should be required, even though the State may not require a permit for sources emitting less than 1000 pounds per month.

The air stripper system may require equipment to reduce the iron content and alkalinity of the groundwater to control potential fouling, scaling and biological problems. A cost estimate is needed for these O&M items, if not already included.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF RESEARCH AND DEVELOPMENT  
RISK REDUCTION ENGINEERING LABORATORY  
CINCINNATI, OHIO 45268

REPLY TO:  
Releases Control Branch  
U. S. EPA (MS-106)  
2890 Woodbridge Avenue  
Edison, New Jersey 08837-3679

DATE: April 1, 1992

SUBJECT: Technical Assistance: Review of SVE for Medley Farm Site,  
South Carolina

FROM: Uwe Frank *U Frank*  
Chemist, Technology Evaluation Section, RCB  
Superfund Technology Demonstration Division

TO: Michelle Simon  
Chemical Engineer, Regional Support Section, TSB  
Superfund Technology Demonstration Division

In accordance with your request, I have reviewed information provided in the ROD, Final Remedial Investigation Report, and the March 6, 1992 Technical Memorandum from RMT, Inc. As requested my review addresses soil vapor extraction (SVE), and specifically the practicality of removing the VOCs of concern from soil at the Medley Farm Site by SVE. In addition, I have also reviewed RMT's recommendation that treatability studies not be performed separately and prior to the design of the SVE system required for the Medley Farm ROD/RA, but that they be integrated with the actual remedial action to optimize the engineering and construction related tasks. The primary factors considered to determine the practicality of SVE at this site were contaminant volatility and concentration, and soil permeability. Within this context, I believe that SVE is an applicable technology for use as a remedial option at this site, and the following provide the justifications for this conclusion. It must be noted, however, that SVE will not be effective for obviously non-volatile compounds such as PCBs and pesticides (toxaphene) also detected in surface soil at the Medley Farm Site (See ROD, Table 5).

As far as contaminant volatility is concerned, the VOCs that are present above the ROD prescribed remediation levels in areas RA-1 and RA-2 are tetrachloroethylene, trichloroethylene, 1,2 - dichloroethylene, 1,2 - dichloroethane, and methylene chloride. The dimensionless Henry's Law constants for these compounds at 20°C are: 0.59, 0.35, cis-0.15/trans - 0.36, 0.06, and 0.10, respectively. In addition the Vapor Pressures of these compounds are orders of magnitude greater than 1.0 mm Hg (Methylene chloride:

- 2 -

350; 1,2 - dichloroethane: 61; etc.). Consequently, SVE has been shown to be effective when the contaminants have a Henry's Law constant greater than 0.01 and vapor pressures of 1.0 mm Hg (20°C) or greater.

The concentration levels for soil remediation also appear appropriate (ROD, Table 3). SVE is not as applicable if the concentration limits are low compound-specific limits (e.g., 5 ug/kg tetrachloroethylene or 10 ug/kg trichloroethylene) to be achieved in a short duration of time. The performance of SVE at such low levels has not been widely demonstrated, especially in nonhomogeneous soils (such as the Piedmont region). However, the site is a good candidate for SVE if the concentration limits to be achieved are high ug/kg limits (e.g., total VOCs greater than 500 ug/kg), as is shown in Table 3.

The soil permeability at the remediation sites have not been determined. Instead, RMT is relying on previous experience. The site lies within the Piedmont Physiographic Province. The geology is typical of the Piedmont surficial layer of residual soil underlain by saprolite and rock. The residual soil thickness ranges from approximately three to thirteen feet. Soil types encountered include silty and clayey sands, silty and sandy clay, and sandy silt. Grain size of the sand fraction is predominantly fine to medium. The thickness of the saprolite unit varies from approximately 25 to 80 feet. Soil type encountered include silty sand and silt. Silty sand is by far the predominant soil typed within the saprolite. SVE is most effective at sites where the water table is 20 feet or greater in depth. Where the water table is nearer the surface (less than 5 to 10 feet), SVE may not be appropriate or, if used, may require some means to lower the water table. In addition, soils such as sands and gravel are highly permeable and amenable to SVE. Fine textured soils high in silt and/or clay are more slowly permeable and SVE may or may not be applicable. Since the Medley farm site is mostly described as consisting of clayey/silty sands, SVE should be applicable.

RMT's proposal to omit treatability studies may have some justification, especially in non-homogeneous areas such as the Piedmont region. Generally, the objective of treatability studies are to develop a well-thought out and reasoned design process and to construct a SVE system that removes the greatest degree of contamination from the site in the most efficient, timely, and cost-effective manner. The attainment of that objective will occur through an understanding of the three main determinants of system effectiveness: the composition and characteristics of the contaminant; the vapor flow path and flow rate; and the location of the contamination with respect to the vapor flow paths. The design of an SVE system is basically a process to maximize the intersection of the vapor flow paths with the contaminated zone. Operation of the system should be done to maximize the efficiency of the contaminant removal and reduce costs. As a minimum it is therefore recommended that air permeability tests be conducted at the site to

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confirm that SVE is applicable. The field tests will provide data on and confirm the air permeability at the site. The data can also be used to measure the radius of influence in the vicinity of the testing point, and either confirm that the 30-40 feet well spacings are adequate or provide information on additional well placement.

If you have any questions, please call me on FTS/340-6626.

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